Technical documentation

Released for customers

Maintenance Instructions

Modulpal/Linapac
Installation of the guide rails

TD10011827 EN 01 / Update: 01/2021

KRONES

Table of contents

1 Preface/safety

1.1 Safety

Always remember: Safety first!

Before using these instructions, always make sure that you comply with the following requirements:

- Generally valid national occupational health and safety regulations
- Safety instructions of the respective customer
- The document "Safety instructions, target group: KRONES personnel, professionals authorised by KRONES" (TD11001401)
- Documentation for the machine (e.g. operating manual, spare parts documentation, electrical documentation)

1.2 Copyright

1.3 Target group

This manual is released for the customer.

1.4 Exclusion of liability

If the work is performed by the customer or its agent instead of by KRONES AG personnel using these instructions, KRONES AG shall not be held liable for repairs or any consequential damage!

1.5 Revision history

Version	Date	Comments
00	09/2014	Revised by INA.
01	01/2021	Designations changed on the cover sheet.

2 Required materials and aids

KRONES .shop

You can find the materials and tools you will need quickly and easily in the KRONES.shop:

shop.krones.com

KRONES .shop

Your digital shopping platform

Easily order the articles you require now via our online shop at:

shop.krones.com

3 Preliminary work

3.1 Base coat on the guide rails

Check the assembly surface and stop surface of the base coat whenever you change the guide rails or install them for the first time.

There must be no traces of paint or differences in thickness of the layer of primer on the surfaces of the column or linear unit that have been worked on.

- Remove any paint or primer that is too thick.
- If there is any mechanical damage on the surfaces that have been worked on or on the unmachined part, e.g. transport damage, please contact the Design department.
- Damage to e.g. the side or back panel can have an adverse affect on the levelness of the surface that has been worked on.
- Minor damage such as nicks and burrs should be smoothed down by mechanical means.
- Inspect the tapped holes.

3.2 Guide rails

The guide rails to be installed are delivered either in a single piece or as two pieces if the length exceeds 3 m. The rail segments are packed individually in a plastic sleeves. If a complete rail is comprised of two segments, the packages will have numbers or letters on them for clear identification. See the illustration below, e.g. the two packages with the stickers marked "4" belong together and comprise a complete guide rail.

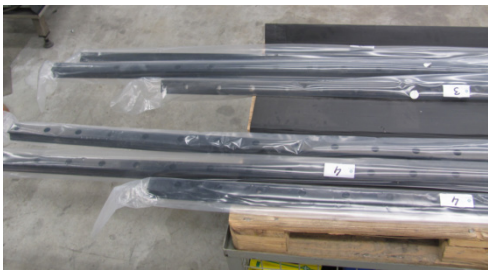

Figure 1: Packed guide rails

- Unpack the guide rails.

- For two-piece guide rails, check that there is an engraved mark on the side in each case at the end of the sharp-edged side. The rail segments must be connected together at the sharp-edged, marked sides.
- See the illustration below, e.g. the two segments with the engraved mark (3) "2A" belong together and form a complete guide rail.

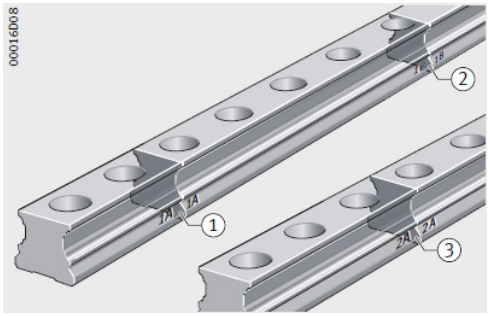

Figure 2: Guide rails connected together

The engraved mark for connecting the rail segments together and the identification number are always engraved opposite the stop side of the guide rail. This ensures that the rail stop side is always clearly defined.

The engraved mark is applied by hand and therefore not always easy to find.

3.3 Fastening screws

Always use new M12 cap screws with strength class 12.9 for installation of the guide rails. These are always supplied in the required quantity with the rails.

- Check the number of screws.
- If the screws do not come with a thread-locking compound, you will need to provide the correct thread-locking compound – Loctite 243 (blue).

- Check the length of the screws. The length depends on the type of rail:

Use	Name in the parts list	Item number
■ Recirculating linear ball bearing rail with 4 rows	Cap screw M12x40	0623766569
■ Recirculating linear ball bearing rail with 6 rows	Cap screw M12x50	0956237021
■ Recirculating roller bearing unit	Cap screw M12x40	0623766569

3.4 Caps

The caps for INA rails are an essential requirement because they are the only way of ensuring that no dirt gets into the runner block, preventing too much grease from escaping and preventing damage to the seals. The caps are always supplied in the required quantity with the rails. There are two different types of cap: 1-piece and 2-piece caps

- Check the quantity of caps supplied.
- The quantity of caps should exceed the number actually required, because caps cannot be re-used if incorrectly fitted.

- Check the cap type. The cap type must match the rail.

Name in the parts list	Item number	Use
■ Cap, 2-part	0902161633	■ These only fit the 4-row recirculating linear ball bearing unit and the linear recirculating roller bearing unit. ■ These can be fitted more easily and securely.
■ Cap, 1-part	0901747051	■ These fit all rail types.

3.5 Required tools

The following tools are required for the work of changing the guide rails on site:

- Mounting iron
- Torque ratchet
- Plastic block approx. 60 x 60 x 60 mm (length x width x height)
- Additional runner block – matching type
- Dial gauge 0.001 mm
- Magnet holder for the dial gauge
- Flat connector with holes for connecting the magnet holder and dial gauge.
- Testing gauge with a thickness of 0.05 mm

Preparations for the installation of the guide rails are now complete.

4 Installation of the first guide rails – stop side

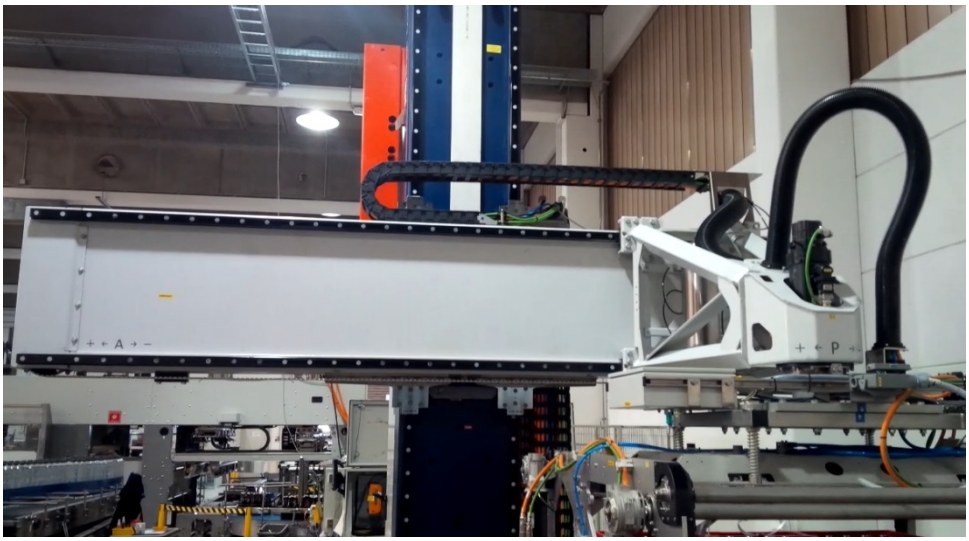

Figure 3: Modulpal 2A

The column and the linear unit are each equipped with two guide rails, which need to be mounted parallel to each other.

The column has a stop edge on one of the two mounting surfaces; the first guide rail is mounted on this. Afterwards, the second guide rail is mounted parallel to the first.

4.1 Fitting the first guide rail

It makes no difference which of the two guide rails is placed on the stop side. The stop side of the guide rail must be placed on the stop edge of the base support.

→ *The location of the stop side of the guide rail is described at the end of section 3.2.*
For two-piece rails, make sure that the marked ends of the rails are properly connected together as described in section 3.2.

- Secure all the screws with thread-locking compound Loctite 243 (blue).
- Place the stop side of the first guide rail on the stop edge of the base support (column or linear unit).
- Screw all the screws loosely into the tapped holes by hand as far as they will go.

Do not use a cordless or pneumatic screwdriver to screw in the screws. Screw them in by hand only. This is the only way of ensuring that damaged screws or threads are identified.

4.2 Adjusting the first guide rail

- Press the first guide rail against the stop edge from the middle outwards and secure it with special mounting tools or screw clamps.
- This can be done with the help of special mounting tools or at least three screw clamps. These must be fitted in an area of approx. 500 mm in the middle of the guide rail. See the following illustrations.

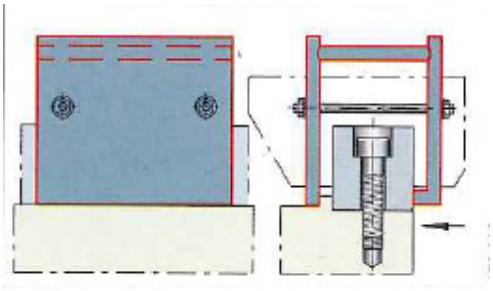

Figure 4: Special mounting tool

Figure 5: Screw clamps on the guide rail

- If the guide rail consists of two segments, the distance between the two segments must be <=0.05 mm. To measure the distance, insert a testing gauge between the segments before you fasten the first screws, then remove it again immediately afterwards.

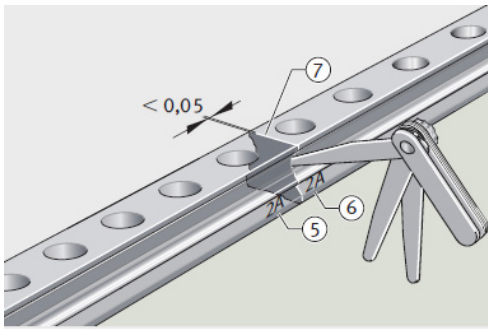

Figure 6: Checking the gap between the segments

- Pre-tension the screws in the area of the guide that has been pressed into position, applying half torque of 70 Nm.
- Move the mounting tools or screw clamps outwards in steps. Pre-tension the screws in the pre-tensioned area.
- Once all the screws for the first guide rail have been pre-tensioned with half the torque, they then need to be re-tightened with the full torque of 140 Nm.

The installation of the first guide rail is now complete.

5 Installation of the second guide rail

For the second guide rail the column body does not have a stop edge. A stop edge can be present on the linear unit. Do not use this second stop edge but use a dial gauge instead to align the second guide rail parallel to the first guide rail.

5.1 Fitting the second guide rail

As with the first guide rail, care must be taken to ensure that the rail joins are properly connected together in case of two-piece rails.

It makes no difference which side the stop side of the guide rail rests on. If possible, install the joint offset to the first guide rail in case of two-piece guide rails.

- Apply thread-locking compound Loctite 243 (blue) to every second screw.
- Screw all the screws loosely into the tapped holes by hand as far as they will go.

Do not use a cordless or pneumatic screwdriver to screw in the screws. Screw them in by hand only. This is the only way of ensuring that damaged screws or threads are identified.

- If the guide rail consists of two segments, the distance between the two segments must be <=0.05 mm. To measure the distance, insert a testing gauge between the segments before you fasten the first screws, then remove it again immediately afterwards.

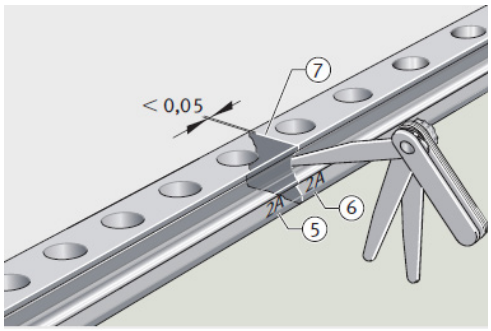

Figure 7: Checking the gap between the segments

Select the distance between the rails so that the screws for the second rail are as central in the hole as possible. This gives you more room to manoeuvre when adjusting.

5.2 Adjusting the second guide rail

- Slide a runner block onto the previously installed first guide rail. This is to be used as a tool. Fasten the magnet holder with dial gauge to the runner block using a flat connector.

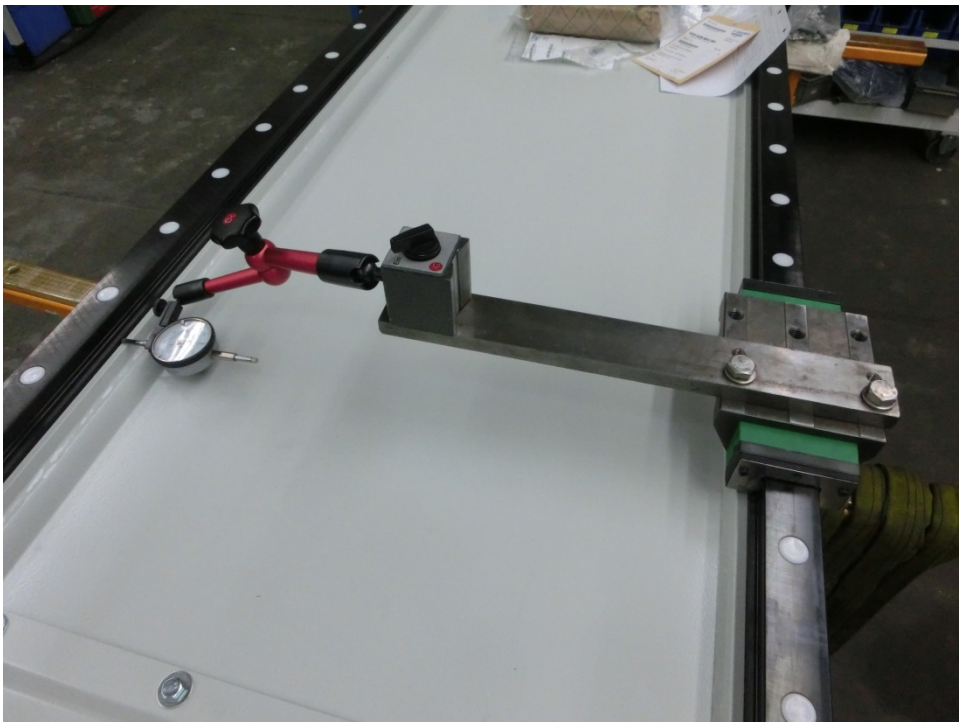

Figure 8: Magnet holder with dial gauge

- Starting from the middle of the complete machine, align the rail parallel to the first rail using a mounting iron and pre-tension at half torque of 70 Nm. To do this, insert the mounting iron in the tapped holes that are still free and use it to lever the rail outwards or inwards.
-

NOTICE

Make sure that the mounting iron does not crush the edges of the holes in the rails and cause burrs as a result. The tapped holes must not be allowed to get damaged by the mounting iron either.

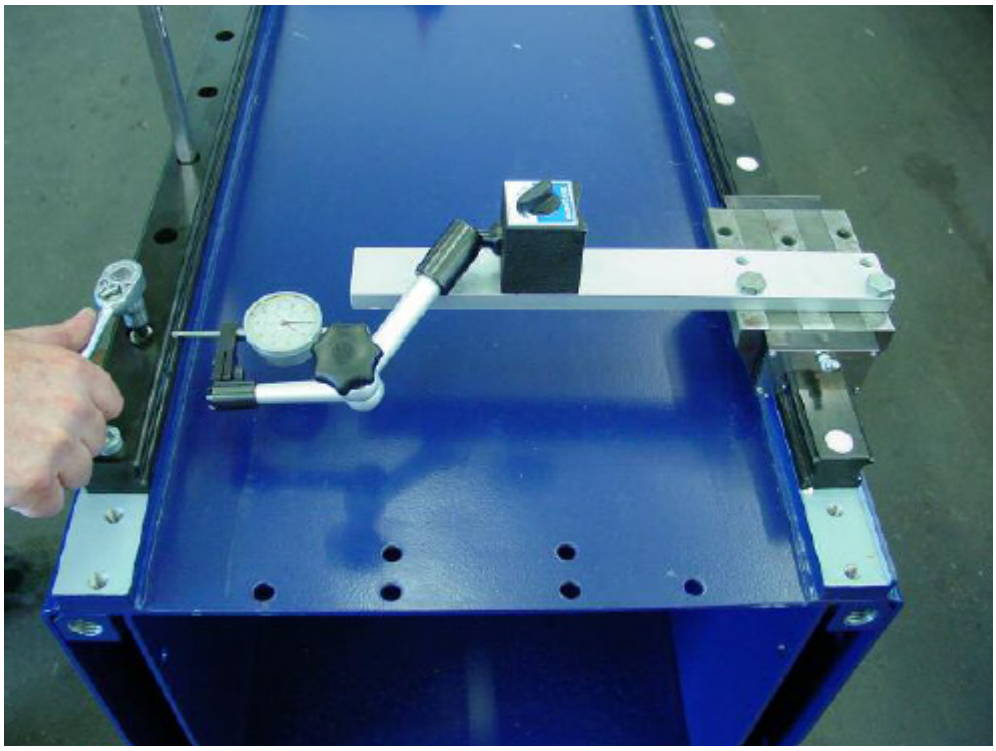

Figure 9: Distance between the guide rails

- Measure the distance between the guide rails:
  It is permissible for the dial gauge to show a maximum overall deviation of 0.017 mm over the total area of the rail.
  Only measure the stop edge of the guide rail, if necessary also the opposite edge (labelled side).
- Once all the screws for the second guide rail have been pre-tensioned with the half torque, re-tighten the screws with the full torque of 140 Nm.

The installation of the second guide rail is now finished.

6 Fitting the caps

The caps are mounted last.

As described in section 2.4, you must use the correct caps.

6.1 2-piece caps

The 2-piece caps (0902161633) are comprised of a cap (2) and a clamping ring (1).

- Place the cap on the head of the screw in the hole. Place a plastic block (3) on the cap and tap it in with a hammer until flush.

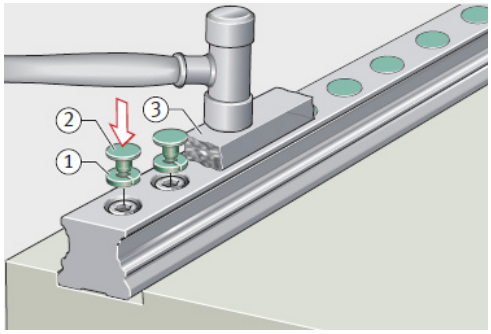

Figure 10: Guide rail with 2-piece caps

When hammered in, the clamping ring (1) expands and the cap (2) is held securely in the hole. There should be no plastic burr on the edge of the hole.

- Remove any burr.

The cap must not project at the edge of the hole. The cap is slightly curved upwards. It is permissible for this to project slightly above the surface of the rail.

Caps that have been tapped in too far must be removed and new ones tapped in instead. They can only be removed by destroying the cap in the process.

- Using a drill, drill a hole in the middle of the cap.
- Lever the cap out of the hole with a screwdriver.

Each cap is only permitted to be used once.

6.2 1-piece caps

The 1-piece caps are only used for 6-row guide rails. However, they would also fit on all other types as well.

- Using a plastic block (2) and a hammer, tap the cap (1) in until flush.

Caps that have been tapped in too far must be removed and new ones tapped in instead. They can only be removed by destroying the cap in the process.

- Tap the cap in with a screwdriver and then lever it out.

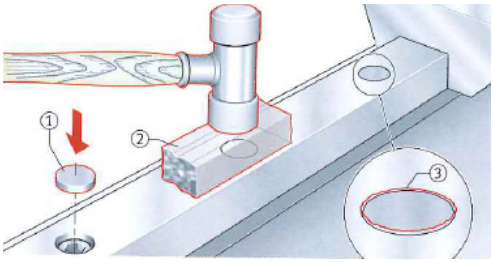

Figure 11: Guide rail with 1-piece caps

Figure 12: Deburring caps

The 1-piece caps are stuck in the holes because they are slightly oversized. There should be no plastic burr (3) on the edge of the hole.

- Remove any burr.

The installation of the guide rails is finished.

7 KRONES Service Line

If you have further questions, or in the event of problems or faults, please contact a member of staff from our Service Line:

Phone: +49 9401 708090

E-mail: serviceline@krones.com

8 List of figures